

Amendments to the Claims:

1-2. (Cancelled)

3. (Currently Amended) Method ~~— according — to — claim 2,~~

A method of segmenting a three-dimensional structure of interest which is contained in an object using a plurality of two-dimensional images, wherein each of the plurality of images represents a slice of the object, the method comprising the steps of:

5 automatically determining which images of the plurality of two-dimensional images have insufficient feature information for the structure of interest, including the steps of:

computer segmenting the structure of interest in each of the plurality of two-dimensional images to generate computer segmented two-dimensional contours;

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computer identifying the two-dimensional images of the plurality of two-dimensional images with insufficient feature information for the structure of interest on the basis of at least one decision criterion;

15 manually drawing attractors in the form of at least a partial contour of the structure of interest in the two-dimensional images of the plurality of two-dimensional images with insufficient feature information; and

with a computer, segmenting the structure of interest with a three-dimensional segmentation process using the attractors and the computer segmented contours of the plurality of two-dimensional images, the three-dimensional segmenting including:

20

~~wherein the segmentation of the structure of interest in the plurality of images is based on an adaptation of fitting~~ a deformable model whose surface is formed by a network of meshes which interconnect network points on the surface of the deformable model to the structure of interest to the attractors and the computer segmented contours; and

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wherein the adaptation of iteratively reconfiguring the
deformable model ~~[[is]]~~ based on an iterative optimization of an
30 internal energy based on a distance between the deformable model
after adaptation and the deformable model and an external energy
based on a distance between the deformable model after adaptation and
feature points on the structure of interest.

4. (Cancelled)

5. (Currently Amended) ~~Method~~ The method according to
claim ~~[[1]]~~ 3, wherein the manual drawing of attractors in the form of at least a partial
contour of the structure of interest in the images of the plurality of two-dimensional
images includes an assignment of labels to voxels corresponding to the at least partial
5 contour such that the attractors are considered as strong edges of the structure of
interest during segmentation.

6. (Currently Amended) ~~Method~~ The method according to
claim ~~[[1]]~~ 5, wherein the method ~~is for radiotherapy planning on the basis of two-~~
dimensional images include CT images.

7. (Currently Amended) ~~Image~~ An image processing device,
comprising:
a memory for storing a plurality of two-dimensional images wherein
each of the plurality of images represents a slice of an object;
5 a pointer for drawing attractors in the plurality of two-dimensional
images; and
an image processor for segmenting a three-dimensional structure of
interest which is contained in the object from the plurality of two-dimensional images,
which image processor is adapted to perform the following operation:
10 determining images of the plurality of two-dimensional
images with insufficient feature information for the structure of
interest;

acquiring attractors manually indicated by a user,
wherein the attractors have the form of at least a partial contour of the
15 structure of interest in the images of the plurality of two-dimensional
images; and
segmenting the structure of interest in the plurality of
images by using the attractors.

8. (Currently Amended) ~~Image~~ The image processing device,
according to claim 7, wherein the memory stores a two-dimensional image
segmentation algorithm; and

wherein the image processor is ~~further adapted to perform the~~
5 ~~following operation for determining images of the plurality of two-dimensional~~
~~images with insufficient feature information for the structure of interest performs the~~
steps of:

segmenting the structure of interest in the plurality of
two-dimensional images using the two-dimensional image
10 segmentation algorithm;

identifying the images of the plurality of two-
dimensional images with insufficient feature information ~~[[for]]~~ to
segment the structure of interest on the basis of at least one decision
criterion.

9. (Currently Amended) ~~Image~~ The image processing device
according to claim 8, wherein the memory stores a three-dimensional segmentation
algorithm; and

wherein the image processor is ~~further adapted~~ configured to perform
5 the three-dimensional segmentation of the structure of interest in the plurality of
images by using the at least partial contour of the structure of interest, which
segmentation is based on an adaptation of algorithm including:

fitting a deformable model whose surface is formed by
a network of meshes which interconnect network points on the surface
10 of the deformable model to the structure of interest to the attractors and

contours of the structure of interest identified in the two-dimensional
segmenting of the plurality of two-dimensional images; and

wherein the image processor is further adapted to
perform the adaptation of iteratively reconfiguring the deformable
15 model on the basis of an iterative optimization of an internal energy
based on a distance between the deformable model after adaptation and
the deformable model and an external energy based on a distance
between the deformable model after adaptation and feature points on
the structure of interest.

10. (Currently Amended) ~~Image~~ The image processing device
according to claim 7, wherein the image processor ~~[[is]]~~ further ~~adapted to perform~~
performs the segmentation of the structure of interest in the plurality of two-
dimensional images based on an adaptation of a three-dimensional deformable model
5 whose surface is formed by a network of meshes which interconnect network points
on the surface of the deformable model to the structure of interest; and

wherein the image processor is further ~~adapted to perform~~ performs the
adaptation of the deformable model on the basis of an iterative optimization of an
internal energy based on a distance between the deformable model after adaptation
10 and the deformable model and an external energy based on a distance between the
deformable model after adaptation and feature points on the structure of interest.

11. (Currently Amended) ~~Image~~ The image processing device
according to claim ~~[[7]]~~ 9, further including:
a display device; and
wherein the image processor displays a manually movable cursor on
5 the display for use by an operator in ~~wherein the~~ manual drawing ~~[[of]]~~ the attractors
in the form of at least a partial contour of the structure of interest ~~[[in the]]~~ on
displayed images of the plurality of two-dimensional images ~~by means of the pointer~~
~~causes the image processor to perform an assignment of labels to to label~~ voxels
corresponding to the at least partial contour such that the attractors are considered as

10 strong edges of the structure of interest ~~during by the three-dimensional~~ segmentation
algorithm.

12. (Currently Amended) ~~Image—The image processing device~~
according to claim 7, ~~wherein the image procession device is further including at least~~
one of a radiotherapy planning device[[,]] and a radiotherapy device[[,]]
~~a workstation, a computer and a personal computer.~~

13. (Currently Amended) A computer-readable medium with a
computer program for an image processing unit for segmenting a three-dimensional
structure of interest which is contained in an object from a plurality of two-
dimensional images using a two-dimensional segmentation algorithm and a three-
5 dimensional segmentation algorithm, wherein each of the plurality of images
represents a slice of the object, which computer program ~~comprises—controls the~~
processing unit to perform the steps of:

segmenting the two-dimensional images using the two-dimensional
segmentation algorithm to identify edge voxels of the structure of interest;
10 determining which images of the plurality of two-dimensional images
[[with]] have insufficient feature information [[for]] to identify edge voxels of the
structure of interest;

displaying a pointer by which a user manually indicates acquiring
attractors ~~manually indicated by a user,~~ wherein the attractors have the form of at least
15 a partial contour of the structure of interest in the images of the plurality of two-
dimensional images; and

segmenting the structure of interest in the plurality of images [[by]]
with the three-dimensional segmentation algorithm using the attractors and the
identified edge voxels.

14-16. (Cancelled)

17. (New) A system for segmenting a three-dimensional structure of interest which is contained in an object from a plurality of two-dimensional images, wherein each of the plurality of images represents a slice of the object, the system comprising:

5 a memory which stores a two-dimensional segmentation algorithm, a three-dimensional segmentation algorithm, and a plurality of two-dimensional images, each of the plurality of two-dimensional images representing a slice of an object;

 a display;

 an image processor which performs the following operations:

10 separating the plurality of two-dimensional images into a first set of images that is automatically segmentable using the two-dimensional segmentation algorithm and a second set of two-dimensional images that are non-automatically segmentable using the two-dimensional segmentation algorithm due to insufficient boundary designation in a structure of interest in each image in the second set of
15 images;

 automatically segmenting the first set of images using the two-dimensional segmentation algorithm to designate boundaries of the structure of interest in the images of the first set of images;

20 causing the display of the second set of non-automatically segmentable two-dimensional images;

 causing the display to display a pointer by which a user manually draws at least a partial contour to designate boundaries of the structure of interest in each image in the second set of non-automatically segmentable images, thereby forming a modified second
25 set of two-dimensional images; and

 with the three-dimensional segmentation algorithm, automatically segmenting the structure of interest in three dimensions based on the boundaries designated in the first set of two-dimensional
30 images and the modified second set of two-dimensional images.